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Multi-dimensional Evolution of Stimulated Scattering and Filamentation*

R. L. Berger, C. H. Still, D. E. Hinkel, A. B. Langdon, E.A. Williams, R. K. Kirkwood, B. J. MacGowan, D. S. Montgomery#, and J. D. Moody
Lawrence Livermore National Laboratory, University of California
Livermore, CA 94550

We have constructed a three-dimensional code (F3D) to study the interaction of stimulated back scattering and filamentation instabilities driven by laser beams that have large but statistically well-understood nonuniformity, e.g. at the focal plane of a laser with random phase plates (RPP). In support of gasbag experiments at LLNL with the Nova laser (and reported at this conference) in which the electron density is nearly 1/10 critical ($\sim 10^{21}$ cm^{-3}), the electron temperature is $T_e \sim 3$ keV, and nearly constant over 1-2mm, we have studied the behavior of this competition and collaboration between instabilities as a function of laser intensity, laser f-number, ion acoustic damping rate, and electron density. The effects of laser beam smoothing produced with SSD are also examined. Simulations in plasmas with strong flow gradients that limit SBS growth but not filamentation will be compared to the uniform plasma simulations.

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